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SOME NEW AND LITTLE-KNOWN PERCOID FISHES.

BY HENRY W. FOWLER.

In this paper I give an annotated list of the more generalized percoid fishes of special interest to be found in the collections of the Academy of Natural Sciences of Philadelphia. Other papers dealing with remaining families are expected to follow.

Owing to the more general acceptance of the view among naturalists that the first species under a genus be considered the type, I abandon the process of elimination. Cases only apply where no type is designated or tautonomy is not inferred. Further I shall retain words different only etymologically, though with a strict adherence to the original orthography, even when erroneous, provided there is no evidence contrary.

DULEIDÆ.

This name supersedes *Kuhliïdæ,* as *Kuhlia* Gill, *Proc. Acad. Nat. Sci. Phila.,* 1861, p. 48 (type *Perca ciliata* Cuvier specified = *Centropomus rupestris* Lacépède), is superseded by *Dules* Cuvier, *Règne Animal,* Ed. 2, II, 1829, p. 147 (type *Centropomus rupestris* Lacépède by first species).

Dules marginatus boninensis subsp. nov. Fig. 1.

Head 3; depth $2\frac{1}{2}$; D. X, 11; A. III, 12; P. I, 13; V. I, 5; scales 50 in lateral line to base of caudal, and several more on latter; 6 scales obliquely back from origin of spinous dorsal to lateral line; about 13 scales between origin of spinous anal in a vertical series to lateral line; width of head 2 in its length; depth of head over posterior margin of pupil about $1\frac{1}{3}$; mandible $2\frac{1}{6}$; fifth dorsal spine $1\frac{3}{4}$; first dorsal ray $1\frac{15}{16}$; third anal spine $2\frac{1}{3}$; first anal ray 2; least depth of caudal peduncle $2\frac{5}{6}$; pectoral $1\frac{1}{2}$; ventral $1\frac{2}{3}$; ventral spine $2\frac{1}{6}$; snout 4 in head measured from tip of upper jaw; eye 3; maxillary $2\frac{3}{5}$; interorbital space $3\frac{2}{5}$.

Body compressed, rather deep, lower profile a little more evenly convex than upper, and greatest depth falling about midway in postventral region. Back but slightly elevated, and with but a slight keel a short distance in front of spinous dorsal, otherwise edges of body rounded. Caudal peduncle compressed, its least depth about $1\frac{1}{4}$ in its length.

Head rather large, compressed, upper profile nearly straight from tip of snout to origin of spinous dorsal, and lower a little more inclined and convex. Snout rather short, its length about ¾ its width, and rather truncate in front. Eye rather large, rounded, high and anterior, or posterior margin of pupil about midway in length of head. Mouth inclined, moderate, opening superiorly, and with mandible protruding in front. Maxillary narrow, free for about half its length, and its distal expansion about $\frac{4}{7}$ diameter of pupil. Teeth in jaws rather small, in bands. Vomer and palatines with patches of minute teeth. Tongue rather narrow, edentulous, pointed, and free in front. Buccal membranes rather narrow. Nostrils close together, superolateral, and much nearer front of eye than tip of snout. Interorbital space a little broad, slightly convex, and with frontal ridges little prominent. Margin of preorbital dentate. Lower margin of preopercle finely dentate, and posterior margin entire. Opercle with 2 flat backwardly directed pointed spines, well separated, and lower larger. Suprascapula with several rather coarse serratures.

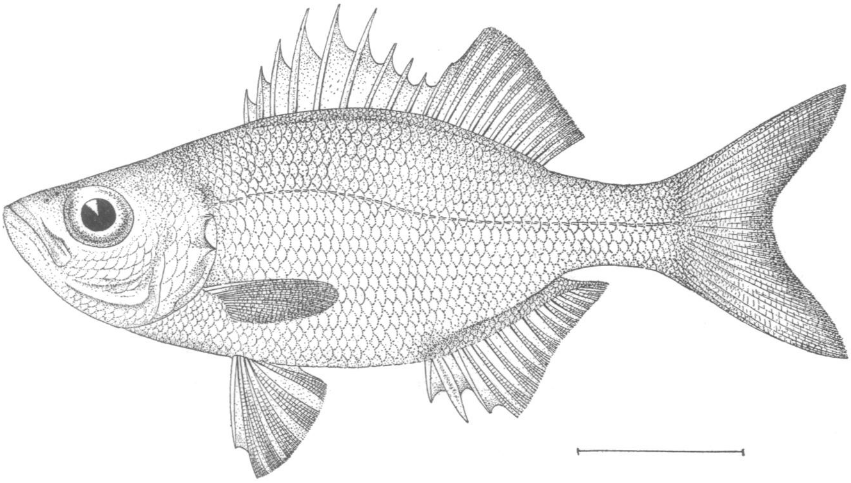

Fig. 1.—*Dules marginatus boninensis* Fowler. (Type.)

Gill-opening extending forward about opposite front margin of orbit. Gill-rakers 10+21, lanceolate, slender, finely asperous inside, and longest about $\frac{4}{7}$ of orbit. Gill-filaments a trifle less than diameter of pupil. Isthmus narrowly compressed, and with a median groove.

Scales finely ctenoid, above lateral line in series parallel with its course, below in horizontal series, along bases of vertical fins small and crowded, and in about 4 series on cheek. Lateral line of simple tubes, and concurrent with dorsal profile.

Origin of spinous dorsal behind that of ventral, spines graduated from fifth, though fourth and sixth subequal, and margin of fin deeply notched. Last dorsal spine longer than second, though shorter than third. Rayed dorsal begins about midway between origin of pectoral and base of caudal, highest from first ray, though without lobe. Origin of spinous anal falling about opposite origin of rayed dorsal, third spine longest, and rayed fin similar to rayed dorsal. Caudal deeply emarginate, lobes pointed. Pectoral short, reaching about 3/5 of space to anal. Ventral inserted behind origin of pectoral, and reaching a little over 2/3 of space to origin of spinous anal.

Color in alcohol pale brown, back slightly leaden, and lower surface paler. Fins all plain pale brownish, margins of dorsals, and caudal posteriorly, slightly dusky. Iris brassy-yellow.

Length 5¼ inches.

Type, No. 11,556, A. N. S. P. Bonin Islands, between lat. 26° 30′ and 27° 44′ N. and long. 140° and 143° E., in the North Pacific. Smithsonian Institution (No. 347).

This form is apparently closely related to *Dules marginatus* Cuvier. It differs from Tahiti examples of that species, however, in having more scales in the lateral line. In this respect it agrees with Hawaiian and Tahiti examples of *Dules mato* Lesson, though the latter differs principally in having more gill-rakers. Examples of *Dules rupestris* (Lacépède) from Samoa and Tahiti have the caudal but slightly emarginate.

(Named for the Bonin Islands.)

BOULENGERINA subgen. nov.

Type *Dules mato* Lesson.

Gill-rakers more numerous than in subgenus *Dules*. *Boulengerina* has 24 to 28 on the lower part of the first arch, while *Dules* has 16 to 20.

The specific name of the typical species dates from *Dules mato* Lesson, *Voy. Aut. Mond. Coquille, Zool.*, III, 1830 (March 22, 1828), p. 223, thus having priority over *Dules malo* Valenciennes, *Hist. Nat. Poiss.*, VII, 1831, p. 360. *Kuhlia malo* now in use must thus give way to *Dules mato*.

(Named for Dr. George A. Boulenger, of the British Museum, well known among naturalists for many excellent works relative to the lower vertebrates.)

MICROPTERIDÆ.

This name supersedes *Centrarchidæ* as *Centrarchus* Cuvier, *Hist. Nat. Poiss.*, III, 1829, p. 62 (type *Cychla æenea* Le Sueur by first species = *Bodianus rupestris* Rafinesque), and is therefore a synonym of *Ambloplites* Rafinesque. This leaves *Eucentrarchus* Gill, *Amer. Journ. Sci. Art.*, XXXVII, 1864, p. 93 (type *Labrus irideus* Lacépède = *Labrus macropterus* Lacépède) as the proper name for the round bass, with the subfamily name changed from *Centrarchinæ* to *Eucentrarchinæ*. Therefore as *Micropterus* Lacépède is the oldest genus in this family the above name may be framed for it.

I have also examined *Elassoma zonatum* Jordan. *Elassoma* probably represents a distinct family, as has been contended.

Pomoxis annularis Rafinesque.

Sedalia and St. Joseph, Mo. (Drs. D. S. Jordan and S. E. Meek); White River, Ark. (Drs. D. S. Jordan and C. H. Gilbert); Leavenworth, Kan. (E. D. Cope). Both this and the next show some variation.

Pomoxis sparoides (Lacépède).

Davenport, Ia. (Dr. S. E. Meek); lower James River, Va. (E. D. Cope); Lake Huron (E. D. Cope); Leavenworth, Kan. (E. D. Cope); Sandusky, O. (Smiths. Inst.); South Carolina (Dr. J. E. Holbrook); New Orleans, La. (J. M. Florat); Neuse River, N. C. (E. D. Cope).

Eucentrarchus macropterus (Lacépède).

North Carolina (U. S. N. Mus.); South Carolina (Dr. Blanding); Bayport, Fla. (E. D. Cope).

Ambloplites rupestris (Rafinesque).

Richmond, Miami and Wabash Rivers, Ind. (E. D. Cope); Brook River and Michigan City (E. D. Cope), and Fort Dodge, Ia. (Dr. S. E. Meek); Detroit, Mich.? (E. D. Cope); Lake Superior (Dr. J. H. Slack); Wisconsin (Smiths. Inst.); Blue River, Ind. (E. D. Cope); Holston and lower James Rivers, Va. (E. D. Cope); Cumberland River, Tenn. (E. D. Cope); French Broad and Yadkin Rivers, N. C. (E. D. Cope); Lake George, N. Y. (W. S. Vaux); Texas (Dr. S. W. Woodhouse).

Ambloplites rupestris cavifrons (Cope). Fig. 2.

Ambloplites cavifrons Cope, Journ. Acad. Nat. Sci. Phila., VI, 1866–69 (December, 1868), p. 217. Type, No. 12,803, A. N. S. P. Headwaters of the Roanoke River, Montgomery county, Va. E. D. Cope.

Width of head $2\frac{3}{5}$ in its length; interorbital space $4\frac{1}{3}$ in head, measured from tip of upper jaw. Lips rather fleshy laterally. Rami of mandible well elevated inside mouth. Teeth small, curved, pointed, a little irregular, and in bands in jaws. Vomerine teeth smaller, in an obtuse-shaped patch, and a narrow band on each palatine. Tongue rather thick, broad, rounded, and well free. A patch of small asperities on tongue. Interorbital space a little convex. A rather trenchant keel from occiput to origin of spinous dorsal. Gill-opening forward opposite front rim of pupil. Rakers IV, 1+6, VII, large, robust, and a little longer than filaments. Scales small and crowded on occiput, predorsal region and thorax. Vent a little nearer tip of ventral spine than origin of spinous anal. In alcohol dull brown, more or less uniform on head and trunk, and fins paler. Faint traces of horizontal streaks following in series of scales. Very indistinct clouded mottlings on vertical fins. A brownish opercular spot. Iris dull brassy-silvery. Length 3 inches. Type.

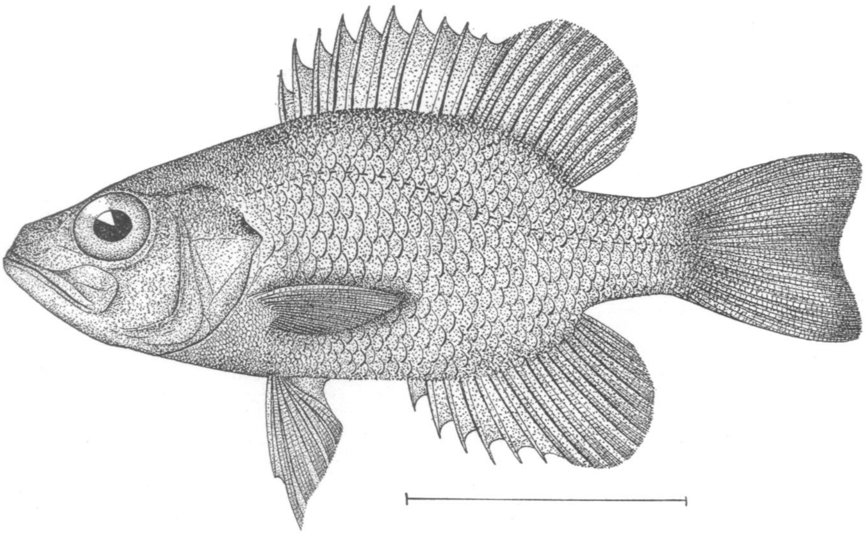

Fig. 2.—*Ambloplites rupestris cavifrons* (Cope). (Type of *Ambloplites cavifrons* Cope.)

Archoplites interruptus (Girard).

Centrarchus interruptus Girard, Proc. Acad. Nat. Sci. Phila., 1854, p. 129. Cotypes, Nos. 13,430 (type) to 13,433, A. N. S. P. Sacramento River, Cal. Dr. A. L. Heermann. Coll. Smiths. Inst.

Another from same locality (U. S. F. Com.); San Joaquin River, Cal. (Dr. Newberry).

Chænobryttus gulosus (Cuvier).

Lepomis gillii Cope, Journ. Acad. Nat. Sci. Phila., VI, 1866–69 (December, 1868), pp. 222, 225. Type, No. 12,789, A. N. S. P. Branch of Tuckahoe Creek, in the bottoms of James River, twelve miles above Richmond. E. D. Cope.

Lepomis charybdis Cope, *l.c.*, pp. 223, 224, was based on *Calliurus melanops* Girard, Proc. Acad. Nat. Sci. Phila., 1857, p. 200, from fresh waters of Texas.

One example taken from the stomach of an alligator from Taylor's Creek, Lake Okeechobee, Fla. (Prof. A. Heilprin); Volusia, Fla. (E. D. Cope); Neuse and Roanoke Rivers, N. C. (E. D. Cope); Mobile, Ala. (Mus. Comp. Zool.); San Diego, in Duval county, Tex. (E. D. Cope); Indiana (E. D. Cope).

Enneacanthus gloriosus (Holbrook).

Pomotis guttatus Morris, Proc. Acad. Nat. Sci. Phila., 1859, p. 3. Type, No. 22,598, A. N. S. P. Vicinity of Philadelphia. Dr. J. Cheston Morris .

Hemioplites simulans Cope, Journ. Acad. Nat. Sci. Phila., VI, 1866–69 (December, 1868), p. 217, Pl. 22, fig. 7. Type, No. 13,449, A. N. S. P. Slow waters of Tuckahoe Creek, which enters the James River above Richmond, Virginia. E. D. Cope.

Dr. Boulenger confuses this species with the next in *Cat. Fish. Brit. Mus.*, Ed. 2, I, 1895, p. 19, as *Apomotis obesus.*

Neuces River, N. C., and lower James River, Va. (E. D. Cope).

Enneacanthus obesus (Girard).

Volusia, Fla. (E. D. Cope), and Concord, Mass. (Dr. J. H. Slack). One of the examples on which Morris based his *Pomotis guttatus* is this species, however, as the name and intention are apparently to indicate the preceding species, it may be restricted to the same.

Apomotis cyanellus (Rafinesque).

Bryttus signifer Girard, Proc. Acad. Nat. Sci. Phila., 1857, p. 201. Cotype, No. 13,187, A. N. S. P. Rio Medina, Texas. Dr. C. B. Kennerly. Smiths. Inst. (No. 422).

Bryttus mineopas Cope, Proc. Acad. Nat. Sci. Phila., 1865, p. 84. Cotypes, Nos. 13,190 to 13,194, A. N. S. P. Minneopa, Minnesota. J. H. Slack.

St. Joseph and Brownsville (Drs. D. S. Jordan and S. E. Meek), James River and Marshfield (Drs. C. H. Gilbert and S. E. Meek), and Greenfield, Mo. (Dr. S. E. Meek); Ames, Ia. (Dr. Meek); Fort Riley, Kan. (Dr. W. A. Hammond); Hicksville, O. (Dr. Meek); Blue River (E. D. Cope) and Miami River, Ind. (E. D. Cope); Leavenworth, Kan. (E. D. Cope); Archer county, Llano and Wichita Rivers, Tex. (E. D. Cope).

Apomotis is retained generically as the median posterior partition of the air-vessel is only slightly developed, while in the species of *Lepomis* examined it is usually well developed forwards.

Lepomis punctatus (Valenciennes).

Lepomis apiatus Cope, Proc. Amer. Philos. Soc. Phila., XVII, 1877–78, p. 66. Cotypes, Nos. 11,127 to 11,132, A. N. S. P. Volusia, Florida. E. D. Cope.

Caloosahatchie River, Fla. (Prof. A. Heilprin).

Lepomis auritus (Linnæus).

A single example labeled "Roanoke River, Va., E. D. Cope," No. 13,058, A. N. S. P., may be typical of *Lepomis ophthalmicus* Cope, *Journ. Acad. Nat. Sci. Phila.*, VI, 1866–69 (December, 1868), pp. 223, 224. It would agree in length if the caudal were not included, though the measurements of the depth of the body at the origin of the soft dorsal and at the base of the fifth ray of this fin do not.

Pomotis solis Valenciennes, *Hist. Nat. Poiss.*, VII, 1831, p. 352, is apparently a composite species based on examples from Lake Ponchartrain, La., and Philadelphia, Pa. Primarily it seems to be restricted to the Louisianan form, as Dr. Jordan examined the types from Philadelphia and pronounced them as probably identical with *Eupomotis gibbosus*. Drs. Jordan and Evermann, in *Bull. U. S. Nat. Mus.*, No. 47, I, 1896, p. 1001, place the Louisianan fish as a distinct subspecies of *L. auritus*, stating that it has larger cheek scales, about 5 or 6 series, and a large dusky blotch on the last dorsal rays. Bollman, in *Rep. U. S. F. Com.*, 1888 (1892), p. 573, includes *Lepomis mystacalis* Cope as a synonym, and is followed by others, though from my own examination of the types of this latter it is found to be identical with *Lepomis palladus* Mitchill. That the Florida form is not appreciably different upon comparison of alcoholic examples of *L. auritus* from Bayport, Fla. (E. D. Cope); South Carolina (Dr. J. E. Holbrook); Catawba and Yadkin Rivers, N. C. (E. D. Cope); Lake George, N. Y. (W. S. Vaux), I am satisfied. The original account of *Pomotis solis* is hardly complete enough for certainty of identification.

Lepomis megalotis (Rafinesque). Fig. 3.

Lepomis peltastes Cope, Proc. Amer. Philos. Soc. Phila., XI, 1869–70, pp. 453, 454. Cotypes, Nos. 12,978 to 12,981, A. N. S. P. Huron River, Michigan. Prof. Alexander Winchell.

Lepomis haplognathus Cope, *l.c.*, XXII, 1885, p. 168. Cotypes, Nos. 18,888 to 18,889, and 20,397 to 20,398, A. N. S. P. Monterey, Nuevo Leon, Mexico. E. D. Cope.

This is a most variable species, both in color and structure, especially with reference to the opercular flap. It is possible that *Lepomis occidentalis* Meek, *Field Col. Mus. Pub. 65,* Chicago, III, No. 6, 1902, p. 118, Pl. 29, and *L. haplognathus* Cope may exhibit characters in color to render them distinct races of *L. megalotis*. Certainly *L. haplognathus,* judged from the alcoholic types, cannot be distinguished from the very large series of specimens of *L. megalotis*, which covers every variation. Dr. Meek's accounts do not leave it clear to me that his *L. occidentalis* is really distinct. Besides *L. megalotis* Cope, *l.c.*, XI, 1869–70, p. 452, examples representing *L. nitidus* Cope, *l.c.*, p. 453, and *L. longispinis* Cope, *Proc. Acad. Nat. Sci. Phila.*, 1865, p. 83, have been examined, and found to be this species. Llano River, Fort Worth, Wichita River, upper Medina River and Dallas (E. D. Cope), Delaware Creek (Capt. Pope), Brazos River (Dr. Shumard), and Comanche Creek, Tex. (Smiths. Inst.); Goodland, Ind. Ter. (Dr. S. E. Meek); Eureka Springs (Drs. D. S. Jordan and C. H. Gilbert), Paragold (Dr. Meek), Greenway (Dr. Jordan), and Fort Smith, Ark.; Brook River, Ia. (E. D. Cope); Marshfield, Mo. (Drs. Gilbert and Meek); Leavenworth, Kan. (E. D. Cope); Racine, Wis. (U. S. Nat. Mus.); Detroit? (E. D. Cope), Mich. (Dr. Pitcher); Wabash, Blue and Miami Rivers, Ind. (E. D. Cope); Coal Creek, Tenn. (E. D. Cope); Thomasville, Ga. (J. A. G. Rehn).

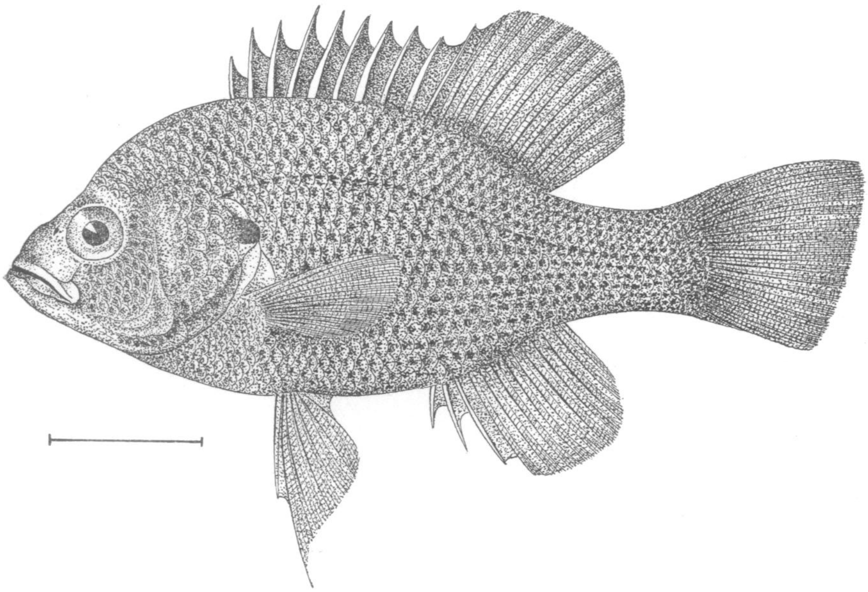

Fig. 3.—*Lepomis megalotis* (Rafinesque). (Type of *Lepomis haplognathus* Cope.)

Lepomis humilis (Girard).

Bryttus humilis Girard, Proc. Acad. Nat. Sci. Phila., 1857, p. 201. Cotypes, Nos. 13,166 to 13,168 and 13,154, A. N. S. P. Sugar Loaf Creek, Arkansas. H. B. Mollhäusen. Smiths. Inst. (No. 428).

Bryttus oculatus Cope, Proc. Acad. Nat. Sci. Phila.. 1865, p. 83. Cotypes, Nos. 13,146 to 13,153, A. N. S. P. Lake Whittlesey, Minn. J. H. Slack.

Lepomis anagallinus Cope, Journ. Acad. Nat. Sci. Phila., VI, 1866–69 (December, 1868), p. 221. Type, No. 13,145, A. N. S. P. Leavenworth, Kansas. Samuel H. Edge.

Arthur (Dr. S. E. Meek), and Fort Worth, Tex. (E. D. Cope); Greenfield (Dr. Meek), Marshfield (Drs. C. H. Gilbert and S. E. Meek), and St. Joseph, Mo.; Fort Riley, Kan. (Dr. W. A. Hammond).

Lepomis macrochirus Rafinesque. Fig. 4.

Lepomis nephelus Cope, Journ. Acad. Nat. Sci. Phila., (2) VI, 1866–69 (December, 1868), p. 222. Type, No. 22,619, A. N. S. P. Kiskiminitas River, West Pennsylvania. A. H. Guss.

Width of head $2\frac{1}{5}$ in its length; interorbital space $3\frac{4}{5}$ in head measured from tip of upper jaw. Edges of body mostly rounded and but slightly trenchant just before origin of spinous dorsal. Head compressed with sides flattened. Length of snout about $\frac{4}{5}$ its width. Lips a little fleshy. Teeth rather coarse, pointed, conic, and in bands in jaws, those on vomer smaller. No palatine teeth. Tongue smooth, rather fleshy, a little pointed and free in front. Each ramus of mandible a little elevated inside mouth. Interorbital space slightly convex. Gill-opening forward to front margin of pupil. Rakers II, 2+10, II, lanceolate, and about equal to filaments or $\frac{1}{2}$ of eye. An adnate scaly

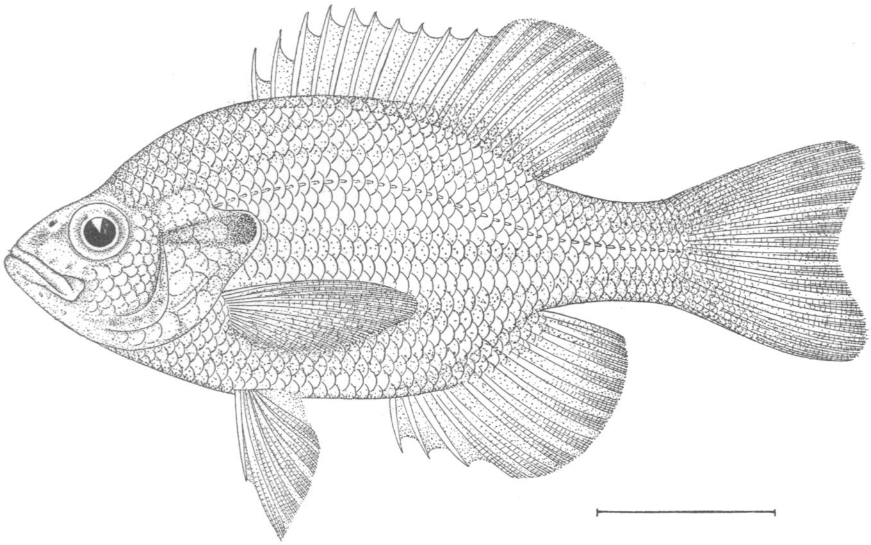

Fig. 4.—*Lepomis macrochirus* Rafinesque. (Type of *Lepomis nephelus* Cope.)

tract between bases of ventrals. Vent about midway, or a little behind, between tips of ventral spines and origin of spinous anal. Color in alcohol faded brown, belly and lower surface of body scarcely paler. Fins all pale brown, scarcely darker towards edges. Opercular blotch blackish-brown, in size about $\frac{2}{3}$ of eye, and from opposite level of latter a dull brownish shade extends from upper end of preopercular margin to opercular blotch, increasing to its width in its course. Iris warm brownish. Inside of gill-opening pale, opercular blotch appearing equally blackish-brown as on outside. Length 4$\frac{5}{8}$ inches. Type.

Lepomis palladus (Mitchill).

Lepomis longispinis Cope, Proc. Acad. Nat. Sci. Phila., 1865, p. 83. Cotypes, Nos. 16,562 to 16,564, A. N. S. P. From St. Louis to Southern California. Dr. A. L. Heermann.

Lepomis ardesiacus Cope, Journ. Acad. Nat. Sci. Phila., VI, 1866–69 (December, 1868), p. 222. Type, No. 13,106, A. N. S. P. Kiskiminitas River, Western Pennsylvania. Addison R. Guss.

Lepomis purpurescens Cope, Proc. Amer. Philos. Soc. Phila., XI, 1869–70, pp. 453, 454. Cotypes, Nos. 13,066 to 13,077, A. N. S. P. Tributary of the Yadkin River in Roane county, North Carolina. E. D. Cope.

Lepomis mystacalis Cope, Proc. Amer. Philos. Soc. Phila., XVII, 1877–78, p. 66. Cotypes, Nos. 27,834 to 27,836, A. N. S. P. Volusia, Florida. E. D. Cope.

These do not differ, though they show about 48 scales, and all agree with examples from Lake Okeechobee. Other examples from Volusia differ, however, most strikingly in the short gill-rakers. One has 54 scales in the lateral line. Another agrees with the figure of *Pomotis elongatus* Holbrook, *Journ. Acad. Nat. Sci. Phila.*, (2) III, 1855–58 (May, 1855), p. 47, Pl. 5.

Examples representing *Pomotis speciosus* Baird and Girard, *Rep. Expl. Surv. R. R. Miss. Pac.*, X, Fish., 1858, p. 23, Pl. 8, figs. 5–8; *P. fallax* Girard, *l.c.*, p. 27, Pl. 8, figs. 9–12, Pl. 9, figs. 5–12, Pl. 10, figs. 1–7, and *Lepomis notatus* Cope, *Proc. Amer. Philos. Soc. Phila.*, XI, 1869–70, p. 453, have been examined. This species is very variable.

French Broad River, N. C. (E. D. Cope); South Carolina (Dr. J. E. Holbrook); Volusia and opposite mouth of St. Lucie River (E. D. Cope), Caloosahatchie River, Fla. (Prof. A. Heilprin); Coal Creek, Tenn. (E. D. Cope); Amana, Ia. (Dr. S. E. Meek); Leavenworth, Kan. (E. D. Cope); Greenway, Ark. (Dr. Meek); Johnson's Fork of the Llano, Wichita River and San Diego (E. D. Cope), Rio Seco (Dr. Kennerly) and Delaware Creek, Tex. (Capt. Pope); Detroit?, Mich. (E. D. Cope); James River at Marshfield, Mo. (Drs. C. H. Gilbert and S. E. Meek); Quincy, Ill.; Blue River, Ind. (E. D. Cope).

Eupomotis holbroockii (Valenciennes).

Xystroplites longimanus Cope, Proc. Amer. Philos. Soc. Phila., XVII, 1877–78, p. 67. Cotypes, Nos. 30,918 to 30,920, A. N. S. P. Volusia. Florida. E. D. Cope.

Dr. Jordan examined *Pomotis holbroockii* Valenciennes in the Paris Museum, and expressed the opinion that it is identical with *P. speciosus* Holbrook. As the original account of the former is imperfect I accept this view provisionally. The differences between Holbrook's figure and the examples before me are certainly not specific. The pectoral of the former is but little shorter than the head. The specific name is here adopted from the original.

Eupomotis gibbosus (Linnæus).

Mount Desert, Me. (Dr. H. C. Chapman); Lake George, N. Y. (W. S. Vaux); Sandusky, O. (Smiths. Inst.); Michigan (E. D. Cope); lower James River, Va. (E. D. Cope); Catawba, French Broad and Yadkin Rivers, N. C. (E. D. Cope).

Micropterus dolomieu Lacépède.

Lake George, N. Y. (W. S. Vaux); Roanoke River, Va. (E. D. Cope); Fort Smith, Ark.; Wheatland and Davenport (Dr. S. E. Meek), and Brook River, Ia. (E. D. Cope); Miami River, Ind. (E. D. Cope); French Broad River, N. C. (E. D. Cope); Coal Creek, Tenn. (E. D. Cope); Fort Worth and Fort Johnson, Tex. (E. D. Cope).

Micropterus salmoides (Lacépède).

Lake Erie (Smiths. Inst.); Dr. J. Cheston Morris; Michigan (E. D. Cope); Davenport, Ia. (Dr. S. E. Meek); Nickajack Cave and Wabash River, Ind. (E. D. Cope); Norfolk (Smiths. Inst.) and lower James River, Va. (E. D. Cope); Yadkin, Catawba and French Broad Rivers, N. C. (E. D. Cope); Coal Creek in Clinch basin, Tenn. (E. D. Cope); South Carolina (Dr. Blanding); Bayport, Fla. (E. D. Cope); Indianola to Neuces, Tex. (Capt. Pope).

PERCIDÆ.

Centropomus lucioperca (Linnæus).

Northern Europe (Bonaparte Coll.). The type of *Centropomus* Lacépède is the present species, therefore the American robalos become *Oxylabrax,* with the family name *Oxylabracidæ.*

Stizostedion vitreum (Mitchill).

Michigan (E. D. Cope); French Broad River, N. C. (E. D. Cope).

Stizostedion canadense (Griffiths).

North America (Bonaparte Coll.); Lake Erie (Dr. Watson).

Stizostedion canadense boreum (Girard).

Battle Creek, Ia. (E. D. Cope).

Perca fluviatilis Linnæus.

Italy (Bonaparte Coll.); Sweden (Prof. J. Kinberg).

Perca flavescens (Linnæus).

Mount Desert, Me. (Dr. H. C. Chapman); Martha's Vineyard, Mass. (Dr. J. H. Slack); Lake George, N. Y. (W. S. Vaux); Cold Pond, near Charlestown, N. H. (Dr. Weber); Sparrow Lake, Ontario (C. P. Ray); Sandusky, O. (Smiths. Inst.); Clear Lake, Ia. (Dr. S. E. Meek); Lake Whittlesey, Minn. (Dr. J. H. Slack); Lake Erie (Dr. Watson); Potomac River (Smiths. Inst.); Chestertown (E. G. Vanatta), and North East, in Cecil county, Md. (H. W. Fowler).

Percina caprodes (Rafinesque).

Perca (*Percina*) *nebulosa* Haldeman, Journ. Acad. Nat. Sci. Phila., 1842, p. 330. Type, No. 22,652, A. N. S. P. The Susquehanna. S. S. Haldeman.

North America (Bonaparte Coll.); Holston River, Va. (E. D. Cope); South Fork of Cumberland River, Tenn. (E. D. Cope); Miami and Wabash Rivers, Ind. (E. D. Cope); Ohio (U. S. Nat. Mus.); Fort Smith, Ark. (Drs. D. S. Jordan and C. H. Gilbert); Marshfield and Carthage, Mo. (Drs. Gilbert and S. E. Meek); Dallas, Tex. (E. D. Cope).

Percina caprodes zebra (Agassiz).

Sparrow Lake, in Simcoe county, Ontario (C. P. Ray).

Hadropterus phoxocephalus (Nelson).

Clinton, Mo. (Drs. D. S. Jordan and S. E. Meek).

Hadropterus macrocephalus (Cope).

Etheostoma macrocephalum Cope, Trans. Amer. Philos. Soc. Phila., (2) XIII, 1869, p. 400. Cotypes, Nos. 22,626 and 22,628, A. N. S. P. Youghiogheny River in Western Pennsylvania. E. D. Cope.

Hadropterus aspro (Jordan).

Giles county and Walker's Creek, Va. (E. D. Cope); Miami River, Ind. (E. D. Cope); Hicksville, O. (Dr. S. E. Meek).

Hadropterus peltatus (Cope).

Etheostoma peltatum Stauffer, in Cope, Proc. Acad. Nat. Sci. Phila., 1864, p. 233. Type, No. 22,627, A. N. S. P. The Conestoga. Jacob Stauffer.

Buck Creek, N. C. (E. D. Cope).

Hypohomus aurantiacus (Cope).

Cottogaster aurantiacus Cope, Journ. Acad. Nat. Sci. Phila., (2) VI, 1869, p. 211, Pl. 24, fig. 6. Cotypes, Nos. 13,789 (type) and 13,790, A. N. S. P. Holston River, Virginia [according to label]. E. D. Cope.

Cottogaster shumardi (Girard).

Indiana (Dr. D. S. Jordan); Michigan (Prof. M. Miles).

Ulocentra stigmæa (Jordan). Fig. 5.

Boleosoma stigmœum Jordan, Ann. Lyc. Nat. Hist. N. Y., 1876, p. 311. Cotypes, Nos. 20,645 to 20,648, A. N. S. P. Etowah River, Georgia. D. S. Jordan.

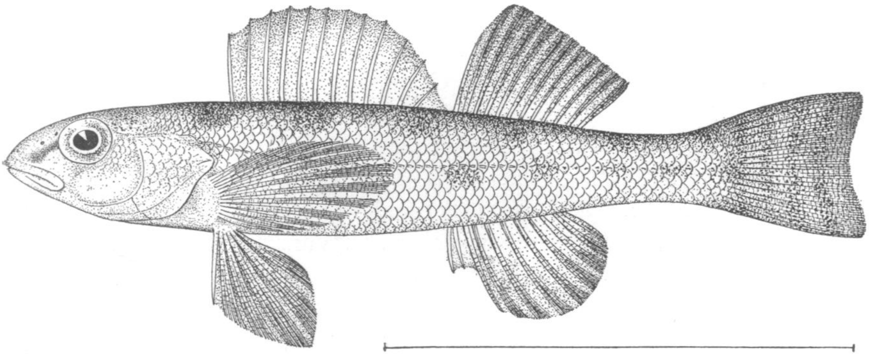

Fig. 5.—*Ulocentra stigmœa* (Jordan). (Cotype of *Boleosoma stigmœum* Jordan.)

Diplesion blennioides (Rafinesque).

Pileoma cymatogramma Abbott, Proc. Acad. Nat. Sci. Phila., 1860, p. 327. Type, No. 14,009, A. N. S. P. Without locality.

Hyostoma blennioperca Cope, Journ. Acad. Nat. Sci. Phila., (2) VI, 1869, pp. 214, 215. Cotypes, Nos. 14,004, 14,006 to 14,008, 14,020 to 14,025 and 14,026 (type) to 14,035, A. N. S. P. Tributaries of the Kanawha and Holston. E. D. Cope. The type as here restricted is evidently the largest in the collection and is from the Holston.

Black River, O. (U. S. Nat. Mus.); South Fork of Cumberland and Clinch Rivers, Tenn. (E. D. Cope); Miami and Richmond, Ind. (E. D. Cope); French Broad River, N. C. (E. D. Cope); Joliet, Ill. (J. H. Ferris).

Boleosoma nigrum (Rafinesque).

Boleosoma olmstedi var. *brevipinnis* Cope, Journ. Acad. Nat. Sci. Phila., 1868, p. 214. Cotypes, Nos. 25,563 (type) to 22,567, A. N. S. P. Kiskiminitas River, Penna. E. D. Cope. In Proc. Amer. Philos. Soc. Phila., XI, 1871, p. 270, Cope raises this to the rank of a full species.

Hicksville, O. (Dr. S. E. Meek); Wabash River and Richmond, Ind. (E. D. Cope); Sinking Creek and Holston River, Va. (E. D. Cope); St. Josephs and Grosse Isle, Mich. (E. D. Cope); Marshfield, Carthage and James River, Mo. (Drs. C. H. Gilbert and S. E. Meek); Belmond and Anamosa (Dr. Meek), and Chariton, Ia. (Drs. D. S. Jordan and S. E. Meek); Platte River at Fort Kearney, Neb.; Big Creek at Fort Hayes, Kan.

Boleosoma nigrum olmstedi (Storer).

Perca minima Haldeman, Journ. Acad. Nat. Sci. Phila., VIII, 1842, p. 330. Type, No. 13,928, A. N. S. P. (A dried skin poorly preserved.) The Susquehanna. S. S. Haldeman.

I am unable to distinguish Potomac River examples (Dr. Pickering) as *Arlina effulgens* Girard.

Patapsco River at Baltimore (H. W. Fowler); Elk Creek (A. H. Grosh and H. W. Fowler) and Stony Creek, in Cecil county, Md. (T. D. Keim and H. W. Fowler); Sussex county, Del. (E. D. Cope); lower Delaware River (Dr. C. Arrott).

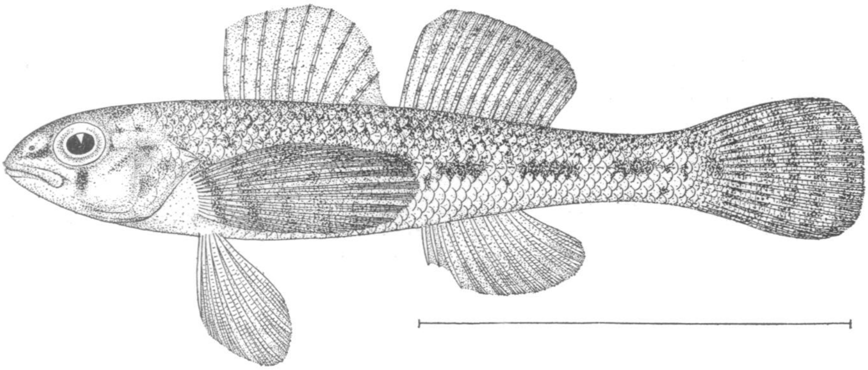

Fig. 6.—*Boleosoma nigrum maculaticeps* (Cope). (Type of *Boleosoma maculaticeps* Cope.)

Boleosoma nigrum maculaticeps (Cope). Fig. 6.

Boleosoma maculaticeps Cope, Proc. Amer. Philos. Soc. Phila., XI, 1871 (January 7, 1870), p. 269. Cotypes, No. 13,862 (type) to 13,876, A. N. S. P. Upper waters of the Catawba River, N. Carolina. E. D. Cope.

Also an example from the Yadkin River, N. C. E. D. Cope.

Boleosoma effulgens Cope, *l.c.*, p. 268, although considered distinct by Cope, does not show any very striking points of difference according to this account. Perhaps 6 scales below the lateral line is reliable.

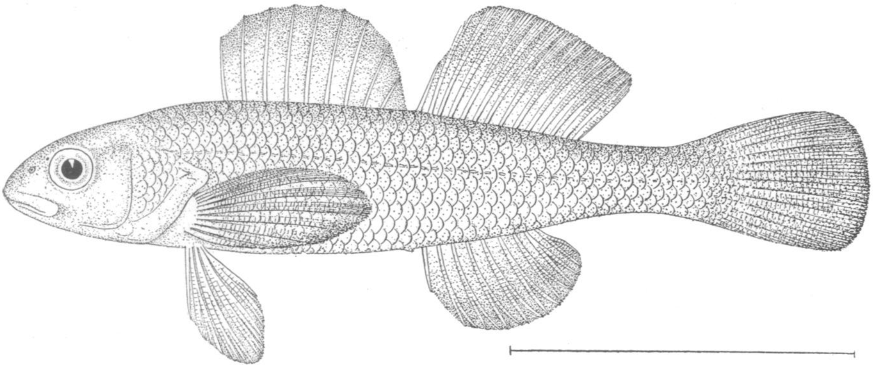

Fig. 7.—*Boleosoma nigrum mesæum* (Cope). (Type of *Pœcilichthys mesæus* Cope.)

Boleosoma nigrum mesæum (Cope). Fig. 7.

Pœcilichthys mesæus Cope, Proc. Acad. Nat. Sci. Phila., 1864, p. 232. Type, No. 13,943, A. N. S. P. Platte River, near Fort Kearney, Neb. Dr. Hammond.

Cross-bars on dorsal and caudal indistinct and faded.

Boleosoma camurum Forbes.

Angelina River, Tex. (U. S. F. C.).

Crystallaria asprella (Jordan).

South Fork Cumberland River, Tenn. (E. D. Cope); Grosse Isle, Mich. (E. D. Cope).

Ammocrypta pellucida (Agassiz).

Indiana (D. S. Jordan).

Etheostoma zonale (Cope). Fig. 8.

Pœcilichthys zonalis Cope, Journ. Acad. Nat. Sci. Phila., (2) XII, 1866–69 (December, 1868), p. 212. Cotypes, Nos. 14,036 (type) to 14,038, A. N. S. P. Holston River, Va. E. D. Cope.

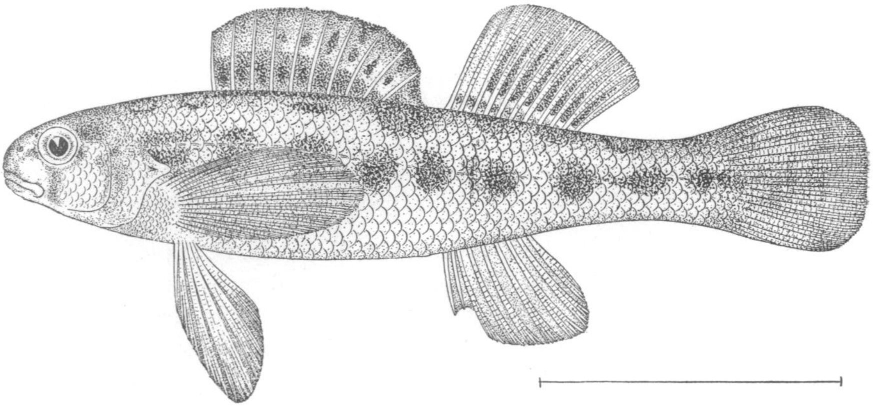

Fig. 8.—*Etheostoma zonale* (Cope). (Type of *Pœcilichthys zonalis* Cope.)

Also many other examples from the above locality and the French Broad River, N. C. (E. D. Cope).

Etheostoma maculatum (Kirtland).

Pœcilichthys sanguifluus Cope, Proc. Amer. Philos. Soc. Phila., XI, 1869–70 (January 7, 1870), p. 264. Cotypes, Nos. 13,738 (type) to 13,744, A. N. S. P. South Fork of Cumberland River, Tennessee. E. D. Cope.

Etheostoma rufilineatum (Cope). Fig. 9.

Pœcilichthys rufilineatus Cope, Proc. Amer. Philos. Soc. Phila., XI, 1869–70 (January 7, 1870), p. 267. Cotypes, Nos. 13,791 (type) to 13,798, A. N. S. P. Warm Springs Creek, which flows into the French Broad River, in Madison county, North Carolina. E. D. Cope.

Etheostoma jessiæ (Jordan).

Etowah River, Ga. (D. S. Jordan).

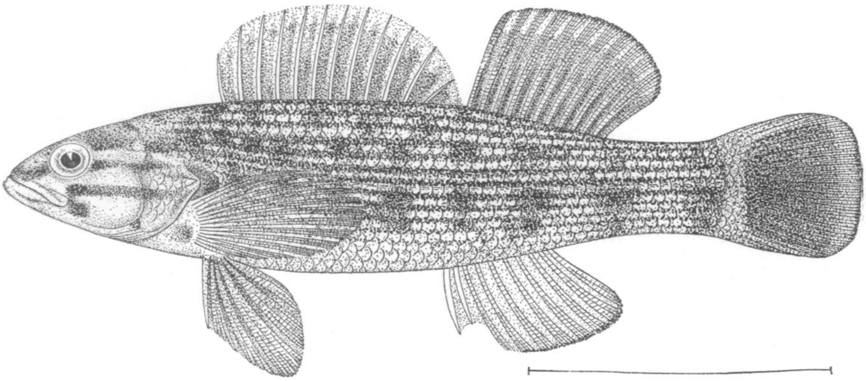

Fig. 9.—*Etheostoma rufilineatum* (Cope). (Type of *Pœcilichthys rufilineatus* Cope.)

Etheostoma cœruleum Storer.

Pœcilosoma transversum Abbott, Proc. Acad. Nat. Sci. Phila., 1860, p. 826. Cotypes, Nos. 13,810 (type) to 13,819, A. N. S. P. Lake Superior.

Richmond, Ind. (E. D. Cope); Big Creek at Fort Hayes, Kan. (J. Janeway); South Fork Cumberland River, Tenn. (E. D. Cope); Ann Arbor, Mich.

Etheostoma cœruleum spectabile (Agassiz).

Marshfield, Mo. (Drs. C. H. Gilbert and S. E. Meek); Sedalia, Mo. (Drs. D. S. Jordan and S. E. Meek).

Etheostoma cœruleum lepidum (Baird and Girard).

Boleosoma phlox Cope, Bull. U. S. Nat. Mus., No. 17, 1880, p. 30. Type, No. 20,447, A. N. S. P. Trinity River, near Fort Worth. E. D. Cope.

Elmfork at Saint Joe, Montague county, Tex. (E. D. Cope).

Etheostoma flabellare Rafinesque.

Sinking and Walker's Creeks, in Kanawha basin, Kanawha, Holston and Roanoke Rivers, Va. (E. D. Cope); Catawba River, N. C. (E. D. Cope); Richmond, Ind. (E. D. Cope); Grosse Isle, Mich. (E. D. Cope); Postville, Ia. (Dr. S. E. Meek).

Boleichthys fusiformis erochrous (Cope).

Sussex county, Del. (E. D. Cope).

Boleichthys fusiformis gracilis (Girard).

Palestine, Tex. (E. D. Cope).

Boleichthys fusiformis palustris (Gilbert).

Indiana (E. D. Cope).

Microperca punctulata Putnam.

Indiana (E. D. Cope).

Asperulus asper (Linnæus).

Rhone River, France (Bonaparte Coll.).

Asperulus Klein, in Walbaum, *Pet. Arted. Gen. Pisc.*, 1792, p. 584 (type *Perca zingel* Linnæus only species mentioned), has priority over *Zingel* Cloquet, *Dict. Sci. Nat.*, IX, 1817, p. 240 (type *Perca zingel* Linnæus first species).

Asperulus zingel (Linnæus).

Danube River (Bonaparte Coll.), and also evidently those from E. D. Cope.

Acerina cernua (Linnæus).

Sweden (Prof. J. Kinberg); Europe (Bonaparte Coll.).

Gymnocephalus schrætser (Linnæus).

Danube?, Europe (Bonaparte Coll.).

APOGONIDÆ.

Foa brachygramma (Jenkins).

Hawaiian Islands (Dr. J. K. Townsend; Dr. William H. Jones).

Apogon imberbis (Linnæus).

The example recorded by Cope from Newport, R. I., as *Apogonichthys americanus* differs a little from Mediterranean examples in the Bonaparte Coll. in having a shorter pectoral, though this may be associated with youth as it only measures $3\frac{1}{8}$ inches. In this respect however it approaches Castelnau's figure, which was based on an example nearly 4 inches long, equal in size to my Mediterranean ones. The Newport specimen shows: Head $2\frac{1}{3}$; depth $2\frac{4}{5}$; snout $4\frac{1}{2}$ in head; eye 3; maxillary 2; interorbital space $4\frac{1}{3}$; pectoral $1\frac{4}{5}$; maxillary reaching posterior margin of pupil; margin of preopercle with minute obsolete serræ; gill-rakers ii, 2+9, iii, and longest about $\frac{2}{5}$ of eye; dark brownish dustings behind eye and on opercle above; a brownish blotch about as large as pupil on caudal peduncle at base of caudal; edges of rayed dorsal and upper and lower edges of caudal tinted dusky.

This and the following are members of the subgenus *Apogon*, distinguished by the presence of VI spines in the first dorsal, and the anterior ridge of the preopercle entire.

Apogon retrosella (Gill).

An example from J. A. McNeil, taken at Panama, from which locality the species has not been obtained before. It has a deep brown saddle on back at base of rayed dorsal, and another larger and obscure one on the caudal peduncle posteriorly. Also a few dusky dots on postocular region. Opercle silvery.

Apogon maculiferus Garrett.

Two examples from the Hawaiian Islands. Coll. Dr. J. K. Townsend.

This species belongs to subgenus *Ostorhinchus* Lacépède, distinguished from the previous subgenus chiefly by the presence of VII spines in the first dorsal. Other species which I have examined are Sumatran examples of *A. evanidus* Fowler, *A. hyalosoma* Bleeker and *A. novemfasciatus* Cuvier, Japanese examples of *A. notatus* (Houttuyn), *A. lineatus* Schlegel, *A. semilineatus* Schlegel and *A. niger* Steindachner. *A. snyderi* Jordan and Evermann and *A. menesemus* Jenkins from the Hawaiian Islands belong to subgenus *Pristiapogon* Klunzinger, distinguished by having both preopercular ridges serrate.

ASTRAPOGON subgen. nov.

Type *Apogonichthys stellatus* Cope.

Distinguished from subgenus *Apogonichthys* Bleeker, *Nat. Tijds. Ned. Ind.*, VII, 1854, pp. 312, 321 (type *Apogonichthys perdix* Bleeker), by the long ventrals, which reach well beyond the front of the anal.

('Αστρον, star; ὰ, without; ποɣ'ων, beard.)

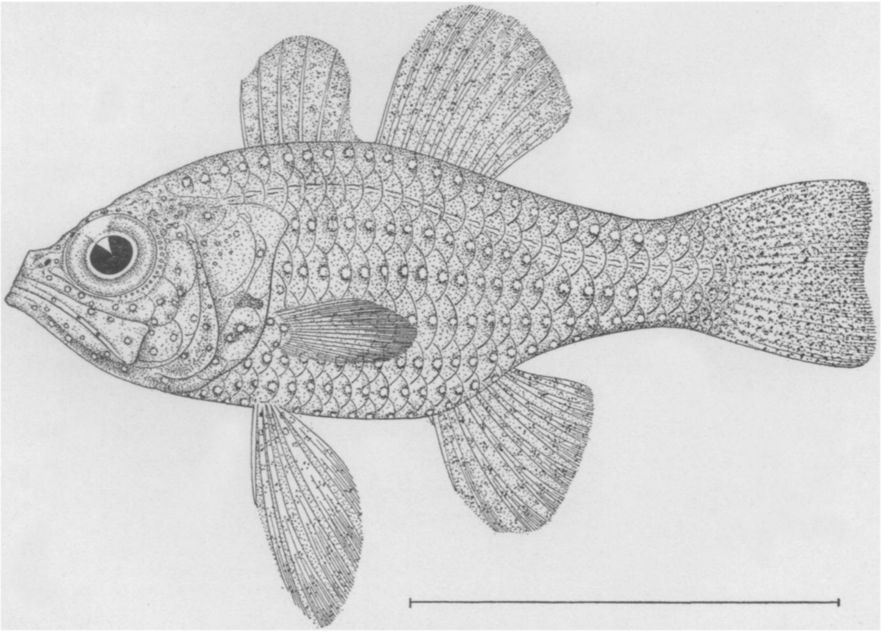

Fig 10.—*Apogonichthys stellatus* Cope. (Type.)

Apogonichthys stellatus Cope. Fig. 10.

> *Tr. Amer. Philos. Soc. Phila.*, (2) XIII, 1866, p. 400. Nos. 12,677 (type) and 12,678, A. N. S. P., cotypes. New Providence, Bahamas. Dr. H. C. Wood.

The larger example may be selected as the type. It has interorbital space 4⅓ in head, and flattened. Gill-rakers II, 2+9, II, slender and longest 3/7 of eye. Length 2 inches.

Both have D. VI.

AMBASSIDÆ.

Ambassis ranga (Hamilton).

Three examples from India. Dr. M. Burrough.

I have also examined *Scombrops boops* (Houttuyn) from Japan.